What is claimed is:

1. System for controlling deceleration of an engine crankshaft in an internal combustion engine, comprising:

at least one sensor producing a sensor signal indicative of an operational condition of the engine;

an engine retarding device configured to produce a retarding torque for decreasing rotational speed of the engine crankshaft; and

a control computer processing the sensor signal produced by the at least one sensor to determine whether the engine is operating with low inertia, the control computer controlling deceleration of the engine crankshaft when the engine retarding device is operational by limiting the retarding torque produced by the engine retarding device if the engine is operating with low inertia.

2. The system of claim 1 further including a number of sensors each producing a different sensor signal indicative of a corresponding different operational condition of the engine;

wherein the control computer is configured to process the number of different sensor signals to determine whether the engine is operating with low inertia.

3. The system of claim 2 further including a clutch coupling the engine to a transmission;

wherein one of the number of sensors is a clutch sensor producing a clutch signal indicative of an operational status of the clutch;

and wherein the control computer is configured to process the clutch signal and determine that the engine is operating with low inertia if the clutch signal indicates that the clutch has disengaged the engine from the transmission.

4. The system of claim 2 wherein one of the number of sensors is an engine speed sensor producing an engine speed signal indicative of rotational speed of the

engine, and another one of the number of sensors is a vehicle speed sensor producing a vehicle speed signal indicative of road speed of a vehicle carrying the engine;

and wherein the control computer is configured to process the engine speed signal and the vehicle speed signal to determine an effective gear ratio of a transmission coupled to the engine, the control computer determining that the engine is operating with low inertia if the effective gear ratio is greater than a threshold gear ratio value.

5. The system of claim 4 further including a tailshaft driven by the transmission;

wherein the vehicle speed sensor is a tailshaft speed sensor, and the vehicle speed signal corresponds to rotational speed of the tailshaft.

6. The system of claim 4 further including a clutch coupling the engine to the transmission;

wherein a further one of the number of sensors is a clutch sensor producing a clutch signal indicative of an operational status of the clutch;

and wherein the control computer is configured to process the clutch signal and determine that the engine is operating with low inertia if the clutch signal indicates that the clutch has disengaged the engine from the transmission.

7. The system of claim 1 further including an engine retarding device selector having a number of user selectable switches, one of the number of user selectable switches corresponding to an on/off switch having an on position for activating the engine retarding device and an off position for deactivating the engine retarding device, and at least another of the number of user selectable switches corresponding to a retarding level selector for selecting a relative level of engine retarding torque to be produced by the engine retarding device;

wherein the control computer is configured to determine that the engine retarding device is operational if the on/off switch is in the on position.

8. The system of claim 7 wherein the control computer includes:

a retarding torque schedule responsive to the engine speed signal and to outputs of the number of user selectable switches to produce an engine retarding torque command, and to produce an engine retarding device active value if the on/off switch is in the on position;

a maximum allowable retarding torque schedule responsive to the engine speed signal, the vehicle speed signal, the clutch signal and the engine retarding device active value to produce a maximum retarding torque value;

torque selection logic producing a selected retarding torque value as a minimum of the engine retarding torque command and the maximum retarding torque value; and

retarding device selection logic controlling operation of the engine retarding device based on the selected retarding torque value.

9. The system of claim 8 wherein the transmission includes a number of automatically selectable gear ratios and a transmission control computer configured to control shifting between the automatically selectable gear ratios, the transmission control computer producing a retarding torque request under specified transmission operating conditions;

and wherein the torque selection logic is configured to produce the retarding torque request as the selected torque value if the retarding torque request is produced by the transmission control computer, and to otherwise produce as the selected torque value the minimum of the engine retarding torque command and the maximum retarding torque value.

10. The system of claim 7 wherein the control computer includes:

a retarding torque schedule responsive to the engine speed signal and to outputs of the number of user selectable switches to produce a first retarding torque value, and to produce an engine retarding device active value if the on/off switch is in the on position;

a speed controller responsive to the vehicle speed signal and a desired vehicle speed value to produce a second retarding torque value;

a maximum allowable retarding torque schedule responsive to the engine speed signal, the vehicle speed signal, the clutch signal and the engine retarding device active value to produce a third retarding torque value corresponding to a maximum retarding torque value;

torque selection logic determining an engine retarding torque command based on the first and second torque values, and producing a selected retarding torque value as a minimum of the engine retarding torque command and the maximum retarding torque value; and

retarding device selection logic controlling operation of the engine retarding device based on the selected retarding torque value.

11. The system of claim 10 wherein the transmission includes a number of automatically selectable gear ratios and a transmission control computer configured to control shifting between the automatically selectable gear ratios, the transmission control computer producing a retarding torque request under specified transmission operating conditions;

and wherein the torque selection logic is configured to produce the retarding torque request as the selected torque value if the retarding torque request is produced by the transmission control computer, and to otherwise produce as the selected torque value the minimum of the engine retarding torque command and the maximum retarding torque value.

12. The system of claim 7 wherein the control computer includes:

a retarding torque schedule responsive to the engine speed signal and to outputs of the number of user selectable switches to produce an engine retarding torque command, and to produce an engine retarding device active value if the on/off switch is in the on position;

torque adjustment logic responsive to the engine speed signal, the vehicle speed signal, the clutch signal and the engine retarding device active value to produce a torque adjustment value;

arithmetic logic responsive to the engine retarding torque command and the torque adjustment value to produce a selected retarding torque value that limits the engine retarding torque command to a maximum retarding torque value; and

retarding device selection logic controlling operation of the engine retarding device based on the selected retarding torque value.

13. The system of claim 12 wherein the transmission includes a number of automatically selectable gear ratios and a transmission control computer configured to control shifting between the automatically selectable gear ratios, the transmission control computer producing a retarding torque request under specified transmission operating conditions;

and wherein the control computer further includes priority logic configured to produce the retarding torque request as the selected torque value if the retarding torque request is produced by the transmission control computer, and to otherwise produce as the selected torque value the minimum of the engine retarding torque command and the maximum retarding torque value.

14. The system of claim 7 wherein the control computer includes:

a retarding torque schedule responsive to the engine speed signal and to outputs of the number of user selectable switches to produce a first retarding torque value, and to produce an engine retarding device active value if the on/off switch is in the on position;

a speed controller responsive to the vehicle speed signal and a desired vehicle speed value to produce a second retarding torque value;

torque selection logic responsive to the first and second torque values to produce an engine retarding torque command;

torque adjustment logic responsive to the engine speed signal, the vehicle speed signal, the clutch signal and the engine retarding device active value to produce a torque adjustment value;

arithmetic logic responsive to the engine retarding torque command and the torque adjustment value to produce a selected retarding torque value that limits the engine retarding torque command to a maximum retarding torque value; and

retarding device selection logic controlling operation of the engine retarding device based on the selected retarding torque value.

15. The system of claim 14 wherein the transmission includes a number of automatically selectable gear ratios and a transmission control computer configured to control shifting between the automatically selectable gear ratios, the transmission control computer producing a retarding torque request under specified transmission operating conditions;

and wherein the control computer further includes priority logic configured to produce the retarding torque request as the selected torque value if the retarding torque request is produced by the transmission control computer, and to otherwise produce as the selected torque value the minimum of the engine retarding torque command and the maximum retarding torque value.

16. The system of claim 7 wherein the engine retarding device includes a total number of actuators each configured to control operation of a different cylinder exhaust valve of the engine;

and wherein control computer includes:

a retarding torque schedule responsive to the engine speed signal and to outputs of the number of user selectable switches to produce an engine retarding torque command, and to produce an engine retarding device active value if the on/off switch is in the on position;

retarder selection limiter logic responsive to the engine speed signal, the vehicle speed signal, the clutch signal and the engine retarding device active value to produce a limit value; and

retarder selection logic controlling operation of the total number of actuators, the retarder selection logic determining a first number of the total number of actuators to activate based on the engine retarding torque command, the retarder selection logic

activating the first number of the total number of actuators if the first number is less than or equal to the limit value and otherwise activating a number of the total number of actuators corresponding to the limit value.

17. The system of claim 16 wherein the transmission includes a number of automatically selectable gear ratios and a transmission control computer configured to control shifting between the automatically selectable gear ratios, the transmission control computer producing a retarding torque request under specified transmission operating conditions;

and wherein the retarder selection logic is configured to activate the first number of the total number of actuators if the first number is less than or equal to the limit value and otherwise activate a number of the total number of actuators corresponding to the limit value only if the retarding torque request is not produced by the transmission control computer, and to otherwise determine a second number of the total number of actuators based on the retarding torque request and activate the second number of the total number of actuators.

18. The system of claim 7 wherein the transmission includes a number of automatically selectable gear ratios and a transmission control computer configured to control shifting between the automatically selectable gear ratios, the transmission control computer producing a retarding torque request under specified transmission operating conditions;

and wherein the engine retarding device includes a total number of actuators each configured to control operation of a different cylinder exhaust valve of the engine;

and wherein control computer includes:

a retarding torque schedule responsive to the engine speed signal and to outputs of the number of user selectable switches to produce an engine retarding torque command, and to produce an engine retarding device active value if the on/off switch is in the on position;

torque selection logic producing a selected retarding torque value, the selected retarding torque value corresponding to the retarding torque request if the retarding

torque request is produced by the transmission control computer and otherwise corresponding to the engine retarding torque command;

retarder selection limiter logic responsive to the engine speed signal, the vehicle speed signal, the clutch signal and the engine retarding device active value to produce a limit value; and

retarder selection logic controlling operation of the total number of actuators, the retarder selection logic determining a first number of the total number of actuators to activate based on the selected retarding torque value, the retarder selection logic activating the first number of the total number of actuators if the first number is less than or equal to the limit value and otherwise activating a number of the total number of actuators corresponding to the limit value.

19. The system of claim 7 wherein the engine retarding device includes a total number of actuators each configured to control operation of a different cylinder exhaust valve of the engine;

and wherein control computer includes:

a retarding torque schedule responsive to the engine speed signal and to outputs of the number of user selectable switches to produce a first retarding torque value, and to produce an engine retarding device active value if the on/off switch is in the on position;

a speed controller responsive to the vehicle speed signal and a desired vehicle speed value to produce a second retarding torque value;

torque selection logic producing a selected retarding torque value corresponding to a minimum of the first and second retarding torque values;

retarder selection limiter logic responsive to the engine speed signal, the vehicle speed signal, the clutch signal and the engine retarding device active value to produce a limit value; and

retarder selection logic controlling operation of the total number of actuators, the retarder selection logic determining a first number of the total number of actuators to activate based on the selected retarding torque value, the retarder selection logic activating the first number of the total number of actuators if the first number is less

than or equal to the limit value and otherwise activating a number of the total number of actuators corresponding to the limit value.

20. The system of claim 19 wherein the transmission includes a number of automatically selectable gear ratios and a transmission control computer configured to control shifting between the automatically selectable gear ratios, the transmission control computer producing a retarding torque request under specified transmission operating conditions;

and wherein the torque selection logic is configured to produce the retarding torque request as the selected torque value if the retarding torque request is produced by the transmission control computer, and to otherwise produce as the selected torque value the minimum of the first and second torque values.

21. The system of claim 1 wherein the engine retarding device is an engine compression brake.

22. A method for controlling engine crankshaft deceleration in an internal combustion engine, the method comprising the steps of:

determining whether the engine is operating with low inertia;

monitoring an operational status of an engine retarding device configured to produce a retarding torque for decreasing rotational speed of the engine crankshaft; and

limiting the retarding torque produced by the engine retarding device if the engine retarding device is operational and if the engine is operating with low inertia.

23. The method of claim 22 wherein the step of determining whether the engine is operating with low inertia includes:

monitoring a clutch signal produced by a clutch sensor operable to sense an operational status of a clutch coupling the engine to a transmission; and

determining that the engine is operating with low inertia if the clutch signal indicates that the clutch has disengaged the engine from the transmission.

24. The method of claim 17 wherein the step of determining whether the engine is operating with low inertia includes:

monitoring an engine speed signal produced by an engine speed sensor operable to sense rotational speed of the engine;

monitoring a vehicle speed signal produced by a vehicle speed sensor operable to sense road speed of a vehicle carrying the engine;

computing an effective gear ratio as a function of the engine speed signal and the vehicle speed signal; and

determining that the engine is operating with low inertia if the effective gear ratio is greater than a threshold gear ratio.

25. The method of claim 24 wherein the step of determining whether the engine is operating with low inertia further includes:

monitoring a clutch signal produced by a clutch sensor operable to sense an operational status of a clutch coupling the engine to a transmission; and

determining that the engine is operating with low inertia if the clutch signal indicates that the clutch has disengaged the engine from the transmission